

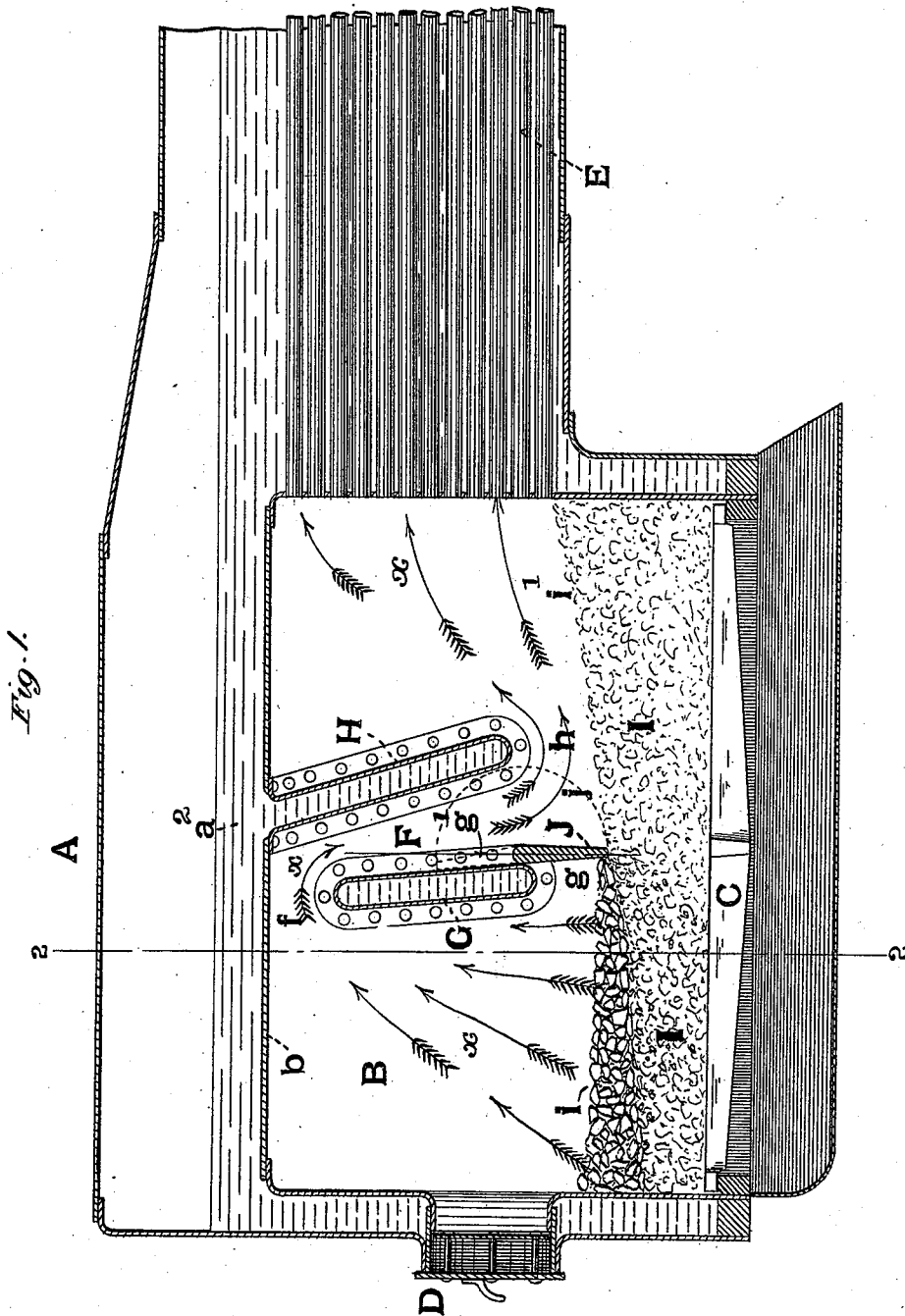
(No Model.)

2. Sheets—Sheet 1.

R. H. BROWN.
LOCOMOTIVE OR OTHER FURNACE.

No. 528,588.

Patented Nov. 6, 1894.



WITNESSES:

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A. Bonville

INVENTOR:

Richard H. Brown
by C. D. Moody
att'y

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Fig. 2.

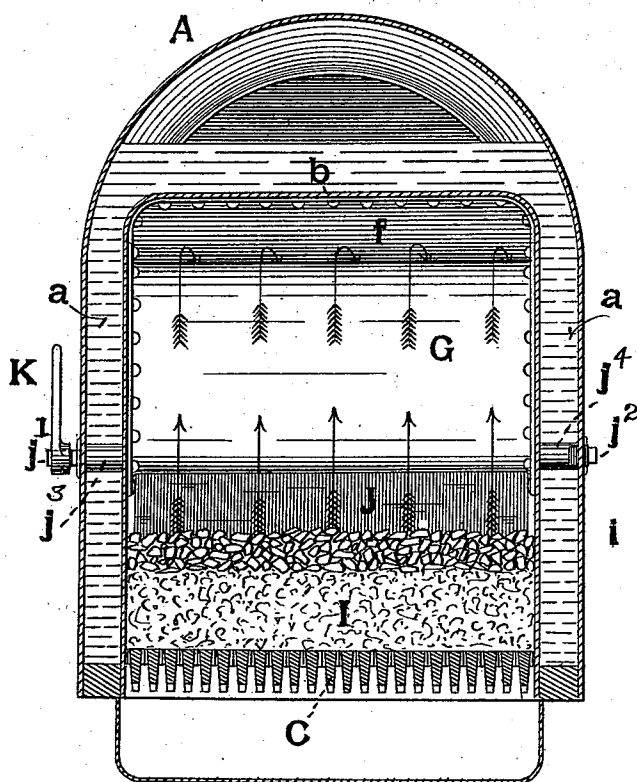


Fig. 3.

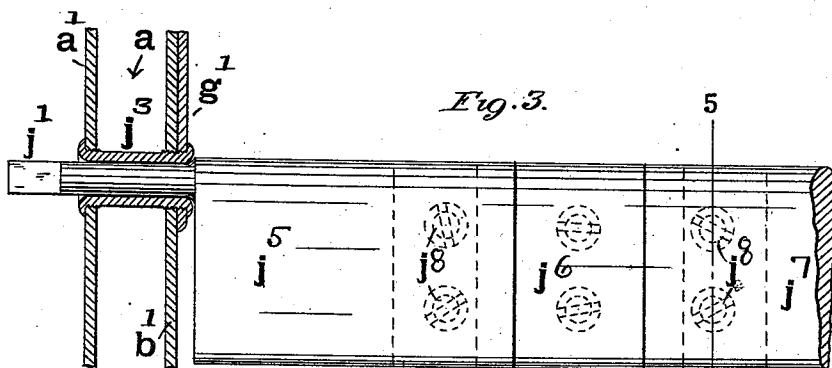


Fig. 5.

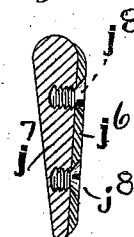
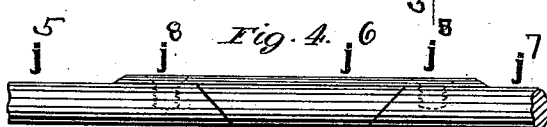


Fig. 4.



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UNITED STATES PATENT OFFICE.

RICHARD H. BROWN, OF ST. LOUIS, MISSOURI.

LOCOMOTIVE OR OTHER FURNACE.

SPECIFICATION forming part of Letters Patent No. 528,588, dated November 6, 1894.

Application filed February 19, 1894. Serial No. 500,604. (No model.)

To all whom it may concern:

Be it known that I, RICHARD H. BROWN, of St. Louis, Missouri, have made a new and useful Improvement in Locomotive or other Furnaces, of which the following is a full, clear, and exact description.

This invention has for its object to provide an improved mode of abating the smoke and more thoroughly consuming the fuel of a furnace, and especially of a locomotive furnace, and it consists mainly in the provision whereby, in firing, the fresh fuel is applied to the forward portion of the fire, and the products of combustion therefrom are prevented from escaping directly from the furnace or fire-box and are caused to wind through a flue formed in the fire-box and to be directed onto the brighter portion of the fire at the rearward end of the fire-box and thereby more thoroughly consumed, substantially as is hereinafter set forth and claimed, aided by the annexed drawings, exhibiting a desirable mode of carrying out the improvement, and making part of this specification, and in which—

Figure 1 is a vertical, central, longitudinal section of a locomotive having the present improvement embodied therein; Fig. 2, a vertical cross section on the line 2—2 of Fig. 1; Fig. 3, a detail upon an enlarged scale, being a view of the damper in part and including one of the damper-bearings; Fig. 4, a top edge view of the middle portion of the damper, and Fig. 5 a section on the line 5—5 of Fig. 3.

The same letters of reference denote the same parts.

A represents a locomotive of ordinary construction saving as it is modified or supplemented by the improvement under consideration. Only that portion of the construction that is needed for an understanding of the improvement is exhibited.

B represents the fire-box of the locomotive; C, the grate of the fire box; D, the doorway to the fire-box, and E the flues leading from the fire-box.

F represents a descending flue formed in the fire-box. It extends across the fire-box between the forward and rearward ends thereof and it is contrived so that the products of combustion from the forward portion of the fire can enter it at or toward the upper end thereof and pass downward through it to en-

counter the rearward portion of the fire before escaping from the fire-box. A desirable mode of constructing the flue is shown in the drawings.

G represents a diaphragm extending across the fire-box and leaving a space, *f*, above it to form the inlet to the flue F, and also leaving a space *g* beneath it and above the level of the top of the fire.

H represents another diaphragm extending across the fire-box in rear of the diaphragm G and extending from the top *b* of the fire box downward toward the portion of the fire-box occupied by the fuel I, but leaving a space, *h*, between it and the top of the fire, substantially as shown.

J represents a damper adapted for closing when desired the space *g* between the diaphragm G and the fire, substantially as shown. While the damper may be otherwise operated for the purpose in question it is preferably made in the form of a revolving damper whose movement is indicated by the broken line *j*, and it is arranged so that, when closed, its upper edge meets the diaphragm G and its lower edge the fire, and it can be upturned against the rear side of the diaphragm G to leave open both the space *g* and the flue F. In the present instance the damper is journaled in the side-walls of the fire-box as shown in Figs. 2 and 3, the damper being provided with journals *j'*, *j''* which are held, and are adapted to turn, in the hollow rivets or bolts *j³*, *j⁴*, which, in the present instance, pass through the flange *g'* of the diaphragm G, and then through the shell *b'* of the fire-box, the water-space *a*, and the outer shell *a'* of the locomotive, and secured substantially as shown. To enable the damper to be readily inserted and withdrawn it is made in parts, *j⁵*, *j⁶*, and *j⁷*, which are detachably united by means of the screws *j⁸*, substantially as shown.

The diaphragms, G and H, may be constructed and supported in position in any desirable manner. They may, for instance, be of brick or other refractory material; but, and partly for the purpose of increasing the heating surface of the construction, I prefer to make them in the form of hollow water chambers whose interiors communicate with the water space of the boiler—that is, the interior of the diaphragm G communicates

at its ends with the water spaces a , a , and the interior of the diaphragm H communicates with the same water-spaces and is also open at its upper edge to communicate with the
5 overhead water space a^2 of the boiler.

The operation of the improved construction is as follows: In starting the fire the damper may be upturned to provide a direct draft from the forward as well as from the rear-
10 ward portion of the fire; but after the fire is under way, and especially when it is desired to introduce a fresh lot, i , of fuel, the fuel already in the fire-box, and which is now incandescent, is pushed rearwardly in
15 the fire-box and is more or less heaped up and accumulated at and toward the rearward end of the fire-box, substantially as is indicated at i' , and the damper is turned down to close the direct escape from the for-
20 ward portion of the fire. This position is substantially shown in Fig. 1. The course of the gaseous current from the forward portion of the fire is now first upward toward the roof of the fire-box and thence into and downward
25 through the flue F and thence onto the incandescent portion of the fire at the rearward part of the fire-box, and after meeting such incandescent portion the course is upward into the flues E, substantially as is indicated by the
30 arrows x . The result is a very thorough consumption of what is otherwise an unconsumed portion of the fuel and a very thorough abatement of the smoke from the fire-box. This
35 operation of shifting the fire rearwardly in the fire-box and closing the damper is repeated as often as may be needed and especially when fresh fuel is introduced. The described diaphragms and flue are to a certain
40 extent useful whether the described damper is or is not employed. It is however preferable to use the damper in connection with the described flue as thereby the desired end is more effectively attained. The diaphragm G

is useful as a means for directing the products of combustion from the forward portion
45 of the fire well upward toward the top of the fire-box, and it also serves to protect (when the parts are relatively arranged as in the present illustration) the upper portion of the
damper from the fire; but the damper, in com-
50 bination with the diaphragm H, is useful irrespective of the diaphragm G, as it, the damper, when turned down serves to hinder the direct escape from the forward portion of the
fire and in conjunction with the diaphragm H
55 to form a portion of a flue that directs the products of combustion downward toward the rearward portion of the fire; and when used without the diaphragm it can be extended
higher upward in the fire box than as shown
60 in the present illustration.

K represents a wrench for operating the damper.

I claim—

1. In a locomotive or other furnace a de-
65 scending flue arranged between the forward end and the rearward end of the furnace substantially as described in combination with a damper for closing the direct escape from the
forward portion of the furnace into the lower
70 end of said flue.

2. In a locomotive or other furnace the combination of the diaphragms and the damper, said diaphragms being arranged to form a de-
scending flue in the middle portion of the fire
75 place, substantially as described.

3. In a locomotive or other furnace the combination of the damper and the diaphragm G, said damper being at the lower end of said
diaphragm substantially as described. 80

Witness my hand this 17th day of February, 1894.

RICHARD H. BROWN.

Witnesses:

C. D. MOODY,
A. BONVILLE.